(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 3 296 076 B1

(12) # EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention of the grant of the patent:
02.10.2019 Bulletin 2019/40

(21) Application number: **17188802.7**

(22) Date of filing: **18.04.2008**

(51) Int Cl.:
B29B 11/14 *(2006.01)* ***B65D 77/06*** *(2006.01)*
B65D 25/14 *(2006.01)* *B29C 49/06 (2006.01)*
B29C 49/22 (2006.01) *B29C 45/16 (2006.01)*
B29K 23/00 (2006.01) *B29K 67/00 (2006.01)*
B29K 77/00 (2006.01) *B65D 23/02 (2006.01)*
B65D 83/00 (2006.01) *B29K 667/00 (2006.01)*

(54) **INTEGRALLY BLOW-MOULDED BAG-IN-CONTAINER HAVING AN INNER LAYER AND THE OUTER LAYER MADE OF THE SAME MATERIAL AND PREFORM FOR MAKING IT**

GÄNZLICH BLASGEFORMTER BEUTEL-IN-BEHÄLTER MIT EINER INNENSCHICHT UND EINER AUSSENSCHICHT, DIE AUS DEMSELBEN MATERIAL HERGESTELLT SIND, UND VORFORM ZUR HERSTELLUNG DAVON

CONTENEUR DANS UN SAC MOULÉ INTÉGRALEMENT PAR SOUFFLAGE PRÉSENTANT UNE COUCHE INTÉRIEURE ET LA COUCHE EXTÉRIEURE FAITE DU MÊME MATÉRIAU ET UNE PRÉFORME POUR SA FABRICATION

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MT NL NO PL PT RO SE SI SK TR

(30) Priority: **19.04.2007 US 785746**

(43) Date of publication of application:
21.03.2018 Bulletin 2018/12

(62) Document number(s) of the earlier application(s) in accordance with Art. 76 EPC:
08736405.5 / 2 148 770

(73) Proprietor: **Anheuser-Busch InBev S.A.**
1000 Brussels (BE)

(72) Inventors:
- **Van Hove, Sarah**
  3000 Leuven (BE)
- **Peirsman, Daniel**
  3000 Leuven (BE)
- **Verpoorten, Rudi**
  6312 Steinhausen (CH)

(74) Representative: **BiiP cvba**
Culliganlaan 1B
1831 Diegem (Bruxelles) (BE)

(56) References cited:
EP-A- 1 245 499 **EP-A- 1 593 605**
WO-A-91/08099 **JP-A- 2000 062 745**

EP 3 296 076 B1

Description

Field of the Invention

[0001] The present invention relates in general to new developments in dispensing bag-in-containers and, in particular, to integrally blow-moulded bag-in- containers made of a single material. It also relates to a method for producing said bag-in-containers and, in particular, to preforms used for their production, as well as a method for producing said preform.

Background of the Invention

[0002] Bag-in-containers, also referred to as bag-in-bottles or bag-in-boxes depending on the geometry of the outer vessel, all terms considered herein as being comprised within the meaning of the term bag-in-container, are a family of liquid dispensing packaging consisting of an outer container comprising an opening to the atmosphere -the mouth- and which contains a collapsible inner bag joined to said container and opening to the atmosphere at the region of said mouth. The system must comprise at least one vent fluidly connecting the atmosphere to the region between the inner bag and the outer container in order to control the pressure in said region to squeeze the inner bag and thus dispense the liquid contained therein.

[0003] Traditionally, bag-in-containers were and still are produced by independently producing an inner bag provided with a specific neck closure assembly and a structural container (usually in the form of a bottle). The bag is inserted into the fully formed bottle opening and fixed thereto by means of the neck closure assembly, which comprises one opening to the interior of the bag and vents fluidly connecting the space between bag and bottle to the atmosphere; examples of such constructions can be found inter alia in US3484011, US3450254, US4,330,066, and US4892230. These types of bag-in-containers have the advantage of being reusable, but they are very expensive and labour-intensive to produce.

[0004] More recent developments focused on the production of "integrally blow-moulded bag-in-containers" thus avoiding the labour-intensive step of assembling the bag into the container, by blow-moulding a polymeric multilayer preform into a container comprising an inner layer and an outer layer, such that the adhesion between the inner and the outer layers of the thus produced container is sufficiently weak to readily delaminate upon introduction of a gas at the interface. The "inner layer" and "outer layer" may each consist of a single layer or a plurality of layers, but can in any case readily be identified, at least upon delamination. Said technology involves many challenges, and many alternative solutions were proposed.

[0005] The multilayer preform may be extruded or injection moulded (cf. US6238201, JP10128833, JPA1010719, JP9208688, US6649121). When the former method is advantageous in terms of productivity, the latter is preferable when wall thickness accuracy is required, typically in containers for dispensing beverage.

[0006] The formation of the vents fluidly connecting the space or interface between bag and bottle to the atmosphere remains a critical step in integrally blow-moulded bag-in-containers and several solutions were proposed in, e.g., US5301838, US5407629, JP5213373, JP8001761, EP1356915, US6649121, JP10180853.

[0007] Preforms for the production of integrally blow-moulded bag-in-containers clearly differ from preforms for the production of blow-moulded co-layered containers, wherein the various layers of the container are not meant to delaminate, in the thickness of the layers. A bag-in-container is comprised of an outer structural envelope containing a flexible, collapsible bag. It follows that the outer layer of the container is substantially thicker than the inner bag. This same relationship can of course be found in the preform as well, which are characterized by an inner layer being substantially thinner than the outer layer. Moreover, in some cases, the preform already comprised vents which are never present in preforms for the production of co- layered containers (cf. EP1356915).

[0008] One redundant problem with integrally blow-moulded bag-in-containers is the choice of materials for the inner and outer layers which must be selected according to strict criteria of compatibility in terms of processing on the one hand and, on the other hand, of incompatibility in terms of adhesion. These criteria are sometimes difficult to fulfil in combination as illustrated below.

[0009] Addressing processing compatibility, EP1356915 and US6649121 proposed that the melting temperature of the outer layer should be higher than the one of the inner layer in order to allow production of integral preforms by injection moulding the outer layer thereof, followed by injecting thereover the inner layer.

[0010] Examples of materials for the outer layer given by the authors include PET and EVOH, whilst polyethylene is given as an example for the inner layer. Though this materials selection could be advantageous for the injection moulding production of the preforms, it is far from optimal for the blow-moulding step since polyethylene and PET are characterized by different blow-moulding temperatures. EP1245499 discloses a bag-in-container which may be produced by blow-moulding a two-layer preform assembly, the inner layer being made of PE or PP, and the outer container of PET, PEN or EVOH. Again, in US6238201 a method is described including coextruding a two-layer parison followed by blow-moulding the parison into a bag-in-container wherein the outer layer preferably comprised an olefin and the inner layer an amorphous polyamide.

[0011] Concerning the materials choice for a weak interfacial adhesion required for ensuring proper delamination of the inner layer from the outer layer upon use, mention is made in JP2005047172 of "mutually non-adhesive synthetic resins." In the review of the background art in US5921416 the use of release layers interleafed between inner and outer layers, forming three- or five-layer structures is mentioned. An example of such construction is described in US5301838 which discloses a complex five layer preform comprising three PET layers interleafed by two thin layers of a material selected from the group of EVOH, PP, PE, PA6. Here again, beside the complexity involved with the production of such preforms, substantial differences in blow-moulding temperatures characterize these different materials. Last but not least, the use of different materials renders recycling of such bag-in-containers problematic as the bag cannot be removed easily from the container after use.

[0012] WO9108099 discloses a co-layered container obtained by blow-moulding a two-layer preform assembly produced by inserting a first, inner preform into a second, outer preform. In one embodiment, an anti-adhesion coating is applied between a thin inner preform and a thick outer preform made of PET to form upon blow-moulding a container with a thin inner liner to allow the inner liner after use to be separated from the container.

[0013] It follows from the foregoing that there remains a need in the field of integrally blow-moulded bag-in-containers, with respect to the choice of materials for the inner and outer layers as well as for recyclability of the bag-in-containers after use.

Summary of the Invention

[0014] The present invention is defined in the appended independent claims. Preferred embodiments are defined in the dependent claims. In particular, the present invention relates to an integrally blow-moulded bag-in-container comprising the same polymer in contact on either side of the interface between the inner and outer layers. More in particular, the present invention relates to an integrally blow-moulded bag-in-container having a neck region and a mouth suitable for dispensing a liquid contained in a collapsible inner bag through the mouth of the bag-in-container, by squeezing the collapsible inner bag upon control of the pressure in a region between the collapsible inner bag and an outer container, said bag-in-container comprising:

- an outer layer made of a polymer and forming the outer container,
- an inner layer made of a polymer and forming the collapsible inner bag, contained in the outer container,
- the outer layer and the inner layer being connected to one another by an interface (24) over substantially the whole of an inner surface of the outer layer, and
- at least one vent fluidly connecting the interface to the atmosphere,

wherein, the same polymer is in contact on either side of the interface.

[0015] The inner and outer layers comprise a semicrystalline material, preferably PET, and they preferably consist of a material selected from PET, PEN, PTT, PA, PP, PE, HDPE, EVOH, PGAc, PLA, and copolymers or blends thereof, wherein more preferably the material is PET or a copolymer or a blend of PET.

[0016] The bag-in-container may comprise more than one vent distributed around a lip of the bag-in-container's mouth. The bag-in-container of the present invention is suitable for containing a beverage, preferably a carbonated beverage, more preferably a malt based fermented beverage.

[0017] The present invention also concerns a preform for blow-moulding a bag-in-container having a neck region and a mouth suitable for dispensing a liquid contained in a collapsible inner bag through the mouth of the bag-in-container, by squeezing the collapsible inner bag upon control of the pressure in a region between the collapsible inner bag and an outer container, for example a bag-in-container as defined supra. The preform of the present invention comprises an inner layer and an outer layer, wherein the preform forms a two-layer container upon blow-moulding, and wherein the thus obtained inner layer of said container releases from the thus obtained outer layer upon introduction of a gas at least at one point of interface between the two layers. The inner and outer layers of the preform are made of the same material. More in particular, the preform of the present invention comprises:

- an inner layer made of a polymer and
- an outer layer made of a polymer,
- a region between inner and outer layers is defined, wherein the inner and outer layers are either:
    - ◦ connected by an interface throughout substantially the whole inner surface of the outer layer, or
    - ◦ separated over a substantial area of the preform's body by a gap containing air,
- said preform interface or gap is in fluid communication with at least one vent (3) opening to the atmosphere,

wherein, the inner layer and the outer layer are made of the same material.

[0018] The preform is preferably formed by an assembly of two separate inner and outer preforms fitted into one another, thus forming a preform assembly. Integral preforms obtained by injection moulding one layer on top of the other can, however, also be used to blow-mould a bag-in-container as defined supra.

[0019] The present invention also concerns a method for producing a bag-in-container as defined supra from the preform defined supra, and an assembly for dispensing liquids, comprising the bag-in-container defined supra.

Brief Description of the Drawings

[0020]

Figure IA is a schematic cross-sectional representation of a first embodiment of a preform according to the present invention and the bag-in-container obtained after blow-moulding thereof.

Figure IB: is a schematic cross-sectional representation of a second embodiment of a preform according to the present invention and the bag-in-container obtained after blow-moulding thereof.

Detailed Description of the Invention

[0021] Referring now to appended Figures IA and IB, there is illustrated an integrally blow-moulded bag-in-container (2) and a preform (1)&(1') for its manufacturing. The preform (1) comprises an inner layer (11) and an outer layer (12) joined at least at the level of the neck region (6) by an interface (shown on the right-hand side). The region between inner and outer layers (11) and (12) may either consist of an interface (14) wherein the two layers are substantially contacting each other, or comprise a gap (14') in fluid communication with at least one vent (3) opening to the atmosphere in (4).

[0022] Many vent geometries have been disclosed and it is not critical which geometry is selected. It is preferred, however, that the vent be located adjacent to, and oriented coaxially with said preform's mouth (5) as illustrated in Figure 1. More preferably, the vents have the shape of a wedge with the broad side at the level of the opening (4) thereof and getting thinner as it penetrates deeper into the vessel, until the two layers meet to form an interface (14) at least at the level of the neck region. This geometry allows for a more efficient and reproducible delamination of the inner bag upon use of the bag-in-container.

[0023] The container may comprise one or several vents evenly distributed around the lip of the bag-in-container's mouth. Several vents are advantageous as they permit the interface of the inner and outer layers (21) and (22) of the bag-in-container (2) to release more evenly upon blowing pressurized gas through said vents. Preferably, the preform comprises two vents opening at the vessel's mouth lip at diametrically opposed positions. More preferably, three, and most preferably, at least four vents open at regular intervals of the mouth lip.

[0024] The preform may consist of an assembly of two separate preforms (11) and (12) produced independently from one another and thereafter assembled such that the inner preform (11) fits into the outer preform (12). This solution allows for greater freedom in the design of the neck and vents. Alternatively, it can be an integral preform obtained by injection moulding one layer on top of the other. The latter embodiment is advantageous over the assembled preform in that it comprises no assembly step and one production station only is required for the preform fabrication. On the other hand, the design of the vents in particular is restricted by this process.

[0025] When intuition suggests, and all the prior art teaches to use *"[different and] mutually nonadhesive synthetic resins*" for the inner and outer layers of a preform for making a bag-in-container (cf. JP2005047172), it has surprisingly been discovered that excellent delamination results between the inner and outer layers can be obtained also with preforms wherein both inner and outer layers consist of the same material. Similar results were obtained both with preform assemblies as well as with integral preforms. In the case of integral, over-moulded preforms, it is generally believed that better results are obtained with semi-crystalline polymers.

[0026] Preferred materials for the layers of the preform and bag-in-container of the present invention are polyesters like PET, PEN, PTT, PTN; polyamides like PA6, PA66, PAI I, PA12; polyolefins like PE, PP; EVOH; biodegradable polymers like polyglycol acetate (PGAc), polylactic acid (PLA); and copolymers and blends thereof.

[0027] The same polymer is considered in contact on either side of the interface between the inner and outer layers in the following cases:

- inner and outer layers consist of the same material (e.g., PET_{inner} - PET_{outer}, regardless of the specific grade of each PET); or
- the inner and outer layers consist of a blend or copolymer having at least one polymer in common, provided said polymer in common is at the interface, whilst the differing polymer is substantially absent of said interface, as in e.g., $(0.85\ PET+0.15\ PA6)_{inner}$ - $(0.8\ PET+0.2\ PE)_{outer}$.

[0028] The presence of low amounts of additives is not regarded as departing from the scope of the present invention so far they do not alter the interface substantially.

[0029] The two layers (11) and (12) of the preform may be connected by an interface (14) throughout substantially the whole inner surface of the outer layer (cf. (1) in Figure IA). Inversely, they may be separated over a substantial area of the preform's body by a gap (14') containing air and which is in fluid communication with at least one interface vent (3) (cf. (Y) in Figure IB). The latter embodiment is easier to realize when using a preform assembly designed such that the inner preform is firmly fixed to the outer preform at the neck region (6) and a substantial gap (14) may thus be formed between inner and outer layers (11) and (12).

[0030] The bag-in-container (2) of the present invention can be obtained by providing a preform as described above; bringing said preform to blow-moulding temperature; fixing the thus heated preform at the level of the neck region with fixing means in the blow-moulding tool; and blow-moulding the thus heated preform to form a bag-in- container. The inner and outer layers (21) and

(22) of the thus obtained bag-in- container are connected to one another by an interface (24) over substantially the whole of the inner surface of the outer layer. Said interface (24) is in fluid communication with the atmosphere through the vents (3), which maintained their original geometry through the blow-moulding process since the neck region of the preform where the vents are located is held firm by the fixing means and is not stretched during blowing.

[0031] It is essential that the interface (24) between inner and outer layers (21) and (22) releases upon blowing pressurized gas through the vents in a consistent and reproducible manner. The success of said operation depends on a number of parameters, in particular, on the interfacial adhesive strength, the number, geometry, and distribution of the vents, and on the pressure of the gas injected. The interfacial strength is of course a key issue and can be modulated by the choice of the material for the inner and outer layers, and by the process parameters during blow-moulding; the pressure-time-temperature window used is of course of prime importance and greatly depends on the material selected for the inner and outer layers.

[0032] Excellent results can be obtained if the blow-moulding process is carried out on a preform as described above, of the type wherein a gap containing air separates the inner and outer layers over a substantial area of the preform's body and wherein said gap is in fluid communication with at least one interface vent and wherein,

- in a first stage, a gas is blown into the space defined by the inner layer to stretch the preform, whilst the air in the gap separating the preform inner and outer layers is prevented from being evacuated by closing said at least one preform interface vent with a valve located in the fixing means; and

- in a second stage, when the air pressure building up in said gap reaches a preset value, the valve opens thus allowing evacuation of the air enclosed in the gap.

[0033] By this method, the inner layer is prevented from entering into contact with the outer layer by the air cushion enclosed within the gap separating the two layers when their respective temperatures are the highest. As stretching proceeds, the gap becomes thinner and air pressure within the gap increases. When the pressure reaches a preset value, the valve closing the vent opening releases, the air is ejected, and the inner layer is permitted to contact the outer layer and form an interface therewith at a stage where their respective temperatures have dropped to a level where adhesion between the layers cannot build up to any substantial level.

[0034] A release agent may be applied at the interface on either or both surfaces of the inner and outer preforms, which are to form the interface of the bag-in-container. Any release agents available on the market and best adapted to the material used for the preform and resisting the blowing temperatures, like silicon- or PTFE-based release agents (e.g., Freekote) may be used. The release agent may be applied just prior to loading the preforms into the blow-moulding unit, or the preforms may be supplied pretreated.

[0035] The application of a release agent is particularly beneficial with respect to the design of the inner layer. Indeed, lowering the interferential adhesive strength facilitates de lamination of the inner layer from the outer layer and hence reduces stress exerted on the inner layer upon delamination, as such the inner layer can be designed very thin and flexible without risking that the inner layer is damaged upon delamination. Clearly, the flexibility of the inner bag is a key parameter for the liquid dispensing and moreover costs savings can be achieved in terms on material savings when the inner layer can be designed very thin.

[0036] Additionally, application of the release agent allows a reduction of the width of the gap separating the inner and outer layers. By reducing the width of said gap, the inner layer of the preform can be designed with a same thickness but a larger radial cross section, resulting in a reduction of the stretch ratio of the inner layer during blow-moulding and hence a reducing potential formation of microcracks in the inner layer.

Example:

[0037] A preform according to the present invention was produced by injecting a melt into a first mould cavity to form the preform's inner layer (11). A melt was injected into a second mould cavity cooled to form the preform's outer layer (12). The two preform components were assembled to form a preform according to the present invention.

[0038] The preform produced as explained above was heated in an oven comprising an array of IR-lamps and then fixed into a blow-moulding mould which walls were maintained at a desired temperature. Air was blown into the preform under pressure. The thus produced bag-in-container was then filled with a liquid and connected to an appliance for dispensing beverage comprising a source of compressed air in order to determine the delamination pressure.

[0039] The delamination pressure was determined as follows. The interface vents of said bag-in-container were connected to the source of compressed air. Air was injected through the vents at a constant pressure and the interface between inner and outer layers was observed; the pressure was increased stepwise until delamination pressure was reached. Delamination pressure is defined as the pressure at which the inner bag separates from the outer layer over the whole of their interface and collapses. The surfaces of the thus separated layers were examined for traces of bonding.

[0040] The delamination pressure of the bag-in-container described above was of about 05 ± 0.1 bar overpressure and showed little trace of cohesive fracture between the inner and outer layers. This example demonstrates that bag-in-containers of excellent quality can be produced with integral preforms according to the present invention.

To summarize:

[0041] An integrally blow-moulded bag-in-container comprises the same polymer in contact on either side of the interface between the inner and outer layers. The inner and outer layers preferably comprise a semicrystalline material and preferably consist of a material selected from PET, PEN, PTT, PA, PP, PE, HDPE, EVOH, PGAc, PLA, and copolymers or blends thereof.

[0042] The bag-in-container preferably further comprises at least one vent in the shape of a wedge with the broad side at the level of the opening thereof and getting thinner as it penetrates deeper into the vessel, until the inner and outer layers meet to form an interface. More than one vent is distributed around the lip of the bag-in-container's mouth.

[0043] A preform for blow-moulding a bag-in-container as defined supra, comprises: an inner layer and an outer layer. Upon blow-moulding the preform, a two-layer container is formed comprising corresponding inner layer and an outer layer, wherein the thus obtained inner layer of said container releases from the thus obtained outer layer upon introduction of a gas at least at one point of interface between the two layers. The inner and outer layers of the preform are the same material. Like the bag-in-container, the inner and outer layers of the preform are preferably made of a semicrystalline material, which can be selected from PET, PEN, PTT, PA, PP, PE, HDPE, EVOH, PGAc, PLA, and copolymers or blends thereof.

[0044] The at least one point of interface is preferably a vent in the shape of a wedge with the broad side at the level of the opening thereof and getting thinner as it penetrates deeper into the vessel, until the inner and outer layers meet to form an interface. More than one vent can be distributed around a lip of the preform's mouth.

[0045] The inner and outer layers of the preform can be connected by an interface throughout substantially the whole inner surface of the outer layer. Alternatively, the inner and outer layers of the preform can be separated over a substantial area of the preform's body by a gap containing air and which is in fluid communication with at least one interface vent.

[0046] The preform can be an assembly of two separate inner and outer preforms fitted into one another, thus forming a preform assembly. Alternatively, the preform can be obtained by injection moulding one layer on top of the other, thus forming an integral preform.

Claims

1. An integrally blow-moulded bag-in-container (2) having a neck region (6) and a mouth (5) suitable for dispensing a liquid contained in a collapsible inner bag (21) through the mouth (5) of the bag-in-container, by squeezing the collapsible inner bag upon control of the pressure in a region between the collapsible inner bag (21) and an outer container (22), said bag-in-container comprising:

    • an outer layer (22) made of a polymer and forming the outer container,
    • an inner layer (21) made of a polymer and forming the collapsible inner bag, contained in the outer container,
    • the outer layer and the inner layer being connected to one another by an interface (24) over substantially the whole of an inner surface of the outer layer, and
    • at least one vent fluidly connecting the interface to the atmosphere,

    characterized in that, the same polymer is in contact on either side of the interface.

2. The bag-in-container according to claim 1, wherein the inner and outer layers comprise a semicrystalline material, preferably PET.

3. The bag-in-container according to claim 2, wherein the inner and outer layers consist of a material selected from PET, PEN, PTT, PA, PP, PE, HDPE, EVOH, PGAc, PLA, and copolymers or blends thereof.

4. The bag-in-container according to any one of the preceding claims, wherein the bag-in-container comprises more than one vent distributed around a lip of the mouth of the bag-in-container.

5. The bag-in-container according to any one of the preceding claims, containing a beverage, preferably a carbonated beverage, more preferably a malt based fermented beverage.

6. A preform (1, 1') for blow-moulding a bag-in-container (2) having a neck region (6) and a mouth (5) suitable for dispensing a liquid contained in a collapsible inner bag (21) through the mouth (5) of the bag-in-container, by squeezing the collapsible inner bag upon control of the pressure in a region between the collapsible inner bag (21) and an outer container (22), said preform comprising:

    • an inner layer (11) made of a polymer and
    • an outer layer (12) made of a polymer,

wherein the inner and outer layers are either:

◦ connected by an interface (14) throughout substantially the whole of an inner surface of the outer layer, or
◦ separated over a substantial area of the preform by a gap (14') containing air,

wherein said preform interface or gap is in fluid communication with at least one vent (3) open to the atmosphere in opening (4), and
characterized in that, the inner layer and the outer layer are made of a same polymer.

7. The preform according to claim 5, formed by an assembly of two separate inner and outer preforms fitted into one another.

8. A dispensing liquid assembly comprising:

(a) the bag-in-container (2) according to any one of claims 1 to 5,
(b) a source of pressurized gas, preferably compressed air,

wherein the source of pressurized gas is connected to the at least one vent (3) of the bag-in-container.

9. A method for producing the bag-in-container (2) according to any one of claims 1 to 5, by providing the preform (1, 1') according to claims 6 or 7; bringing said preform to blow-moulding temperature; fixing the thus heated preform at the level of the neck region (6) of the preform with a fixing means in a blow-moulding tool; and blow-moulding the thus heated preform to form the bag-in-container.

Patentansprüche

1. Einteilig blasgeformter Behälter mit Innenbeutel (2), der einen Halsbereich (6) und einen Mund (5) aufweist, der zum Ausgeben einer in einem faltbaren Innenbeutel (21) enthaltenen Flüssigkeit durch den Mund (5) des Behälters mit Innenbeutel geeignet ist, indem der faltbare Innenbeutel durch Kontrollieren des Drucks in einem Bereich zwischen dem faltbaren Innenbeutel (21) und einem Außenbehälter (22) zusammengedrückt wird, wobei der Behälter mit Innenbeutel Folgendes umfasst:

• eine äußere Schicht (22) aus einem Polymer, die den Außenbehälter bildet,
• eine innere Schicht (21) aus einem Polymer, die den faltbaren Innenbeutel bildet, der in dem Außenbehälter enthalten ist,
• wobei die äußere Schicht und die innere Schicht durch eine Grenzfläche (24) über im Wesentlichen eine gesamte innere Oberfläche der äußeren Schicht miteinander in Verbindung stehen, und
• mindestens eine Lüftungsöffnung, die die Grenzfläche fluidisch mit der Umgebung verbindet,

dadurch gekennzeichnet, dass auf beiden Seiten der Grenzfläche das gleiche Polymer in Kontakt ist.

2. Behälter mit Innenbeutel nach Anspruch 1, wobei die innere Schicht und die äußere Schicht ein teilkristallines Material, bevorzugt PET, enthalten.

3. Behälter mit Innenbeutel nach Anspruch 2, wobei die innere Schicht und die äußere Schicht aus einem Material bestehen, das aus PET, PEN, PTT, PA, PP, PE, HDPE, EVOH, PGAc, PLA und Copolymeren oder Gemischen dieser ausgewählt ist.

4. Behälter mit Innenbeutel nach einem der vorstehenden Ansprüche, wobei der Behälter mit Innenbeutel mehr als eine Lüftungsöffnung umfasst, die um eine Lippe des Munds des Behälters mit Innenbeutel verteilt sind.

5. Behälter mit Innenbeutel nach einem der vorstehenden Ansprüche, der ein Getränk enthält, bevorzugt ein kohlensäurehaltiges Getränk, weiter bevorzugt ein auf Malz basierendes fermentiertes Getränk.

6. Vorform (1, 1') zum Blasformen eines Behälters mit Innenbeutel (2), der einen Halsbereich (6) und einen Mund (5) aufweist, der zum Ausgeben einer in einem faltbaren Innenbeutel (21) enthaltenen Flüssigkeit durch den Mund (5) des Behälters mit Innenbeutel geeignet ist, indem der faltbare Innenbeutel durch Kontrollieren des Drucks in einem Bereich zwischen dem faltbaren Innenbeutel (21) und einem Außenbehälter (22) zusammengedrückt wird, wobei die Vorform Folgendes umfasst:

• eine innere Schicht (11) aus einem Polymer, und
• eine äußere Schicht (12) aus einem Polymer,

wobei die innere und die äußere Schicht entweder:

° durch eine Grenzfläche (14) über im Wesentlichen die gesamte innere Oberfläche der äußeren Schicht miteinander in Verbindung stehen, oder
° über eine erhebliche Fläche der Vorform durch eine Luft enthaltende Spalte (14') getrennt sind,

wobei die Grenzfläche bzw. die Spalte der Vorform in fluidischer Verbindung mit mindestens einer Lüftungsöffnung (3) steht, die zu der Umgebung in der

Öffnung (4) hin geöffnet ist, und
dadurch gekennzeichnet sind, dass die innere Schicht und die äußere Schicht aus dem gleichen Polymer sind.

7. Vorform nach Anspruch 5, die durch eine Anordnung aus zwei getrennten, inneren und äußeren Vorformen gebildet ist, die ineinander passen.

8. Anordnung zum Ausgeben von Flüssigkeit, die Folgendes umfasst:

(a) einen Behälter mit Innenbeutel (2) nach einem der Ansprüche 1 bis 5,
(b) eine Quelle von druckbeaufschlagtem Gas, bevorzugt Pressluft,

wobei die Quelle von druckbeaufschlagtem Gas mit mindestens einer Lüftungsöffnung (3) des Behälters mit Innenbeutel verbunden ist.

9. Verfahren zum Herstellen eines Behälters mit Innenbeutel (2) nach einem der Ansprüche 1 bis 5 durch Bereitstellen der Vorform (1, 1') nach den Ansprüchen 6 oder 7; Erwärmen der Vorform auf Blasformtemperatur; Befestigen der derart erwärmten Vorform in Höhe des Halsbereichs (6) der Vorform mit einem Befestigungsmittel in einem Blasformwerkzeug; und Blasformen der derart erwärmten Vorform, um den Behälter mit Innenbeutel zu bilden.

Revendications

1. Contenant à poche moulée d'une seule pièce par soufflage (2) ayant une région de col (6) et un goulot (5) adaptés pour distribuer un liquide contenu dans une poche intérieure compressible (21) à travers le goulot (5) du contenant à poche, en pressant la poche intérieure compressible par un contrôle de la pression dans une région entre la poche intérieure compressible (21) et un contenant extérieur (22), ledit contenant à poche comprenant :

• une couche extérieure (22) réalisée en un polymère et formant le contenant extérieur,
• une couche intérieure (21) réalisée en un polymère et formant la poche intérieure compressible, contenue dans le contenant extérieur,
• la couche extérieure et la couche intérieure étant raccordées l'une à l'autre par une interface (24) sensiblement sur la totalité d'une surface intérieure de la couche extérieure, et
• au moins un orifice raccordant fluidiquement l'interface à l'atmosphère,

caractérisé en ce que, le même polymère est en contact de chaque côté de l'interface.

2. Contenant à poche selon la revendication 1, dans lequel les couches intérieure et extérieure comprennent un matériau semi-cristallin, de préférence du PET.

3. Contenant à poche selon la revendication 2, dans lequel les couches intérieure et extérieure sont constituées d'un matériau choisi parmi PET, PEN, PTT, PA, PP, PE, HDPE, EVOH, PGAc, PLA, et des copolymères ou mélanges de ceux-ci.

4. Contenant à poche selon l'une quelconque des revendications précédentes, dans lequel le contenant à poche comprend plus d'un orifice réparti autour d'une lèvre du goulot du contenant à poche.

5. Contenant à poche selon l'une quelconque des revendications précédentes, contenant une boisson, de préférence une boisson gazeuse, plus préférentiellement une boisson fermentée à base de malt.

6. Préforme (1, 1') pour mouler par soufflage un contenant à poche (2) ayant une région de col (6) et un goulot (5) adaptés pour distribuer un liquide contenu dans une poche intérieure compressible (21) à travers le goulot (5) du contenant à poche, en pressant la poche intérieure compressible par un contrôle de la pression dans une région entre la poche intérieure compressible (21) et un contenant extérieur (22), ladite préforme comprenant :

• une couche intérieure (11) réalisée en un polymère et
• une couche extérieure (12) réalisée en un polymère,

dans laquelle les couches intérieure et extérieure sont soit :

◦ raccordées par une interface (14) sensiblement à travers la totalité d'une surface intérieure de la couche extérieure, soit
◦ séparées sur une zone substantielle de la préforme par un écartement (14') contenant de l'air,

dans laquelle ladite interface ou ledit écartement de préforme est en communication fluidique avec au moins un orifice (3) ouvert sur l'atmosphère dans l'ouverture (4), et
caractérisée en ce que, la couche intérieure et la couche extérieure sont réalisées en un même polymère.

7. Préforme selon la revendication 5, formée par un ensemble de deux préformes intérieure et extérieure séparées installées l'une dans l'autre.

8. Ensemble de distribution de liquide comprenant :

(a) le contenant à poche (2) selon l'une quelconque des revendications 1 à 5,
(b) une source de gaz sous pression, de préférence de l'air comprimé,

dans lequel la source de gaz sous pression est raccordée à l'au moins un orifice (3) du contenant à poche.

9. Procédé de production du contenant à poche (2) selon l'une quelconque des revendications 1 à 5, en fournissant la préforme (1, 1') selon les revendications 6 ou 7 ; amener ladite préforme à une température de moulage par soufflage ; fixer la préforme ainsi chauffée au niveau de la région de col (6) de la préforme avec un moyen de fixation dans un outil de moulage par soufflage ; et mouler par soufflage de la préforme ainsi chauffée pour former le contenant à poche.

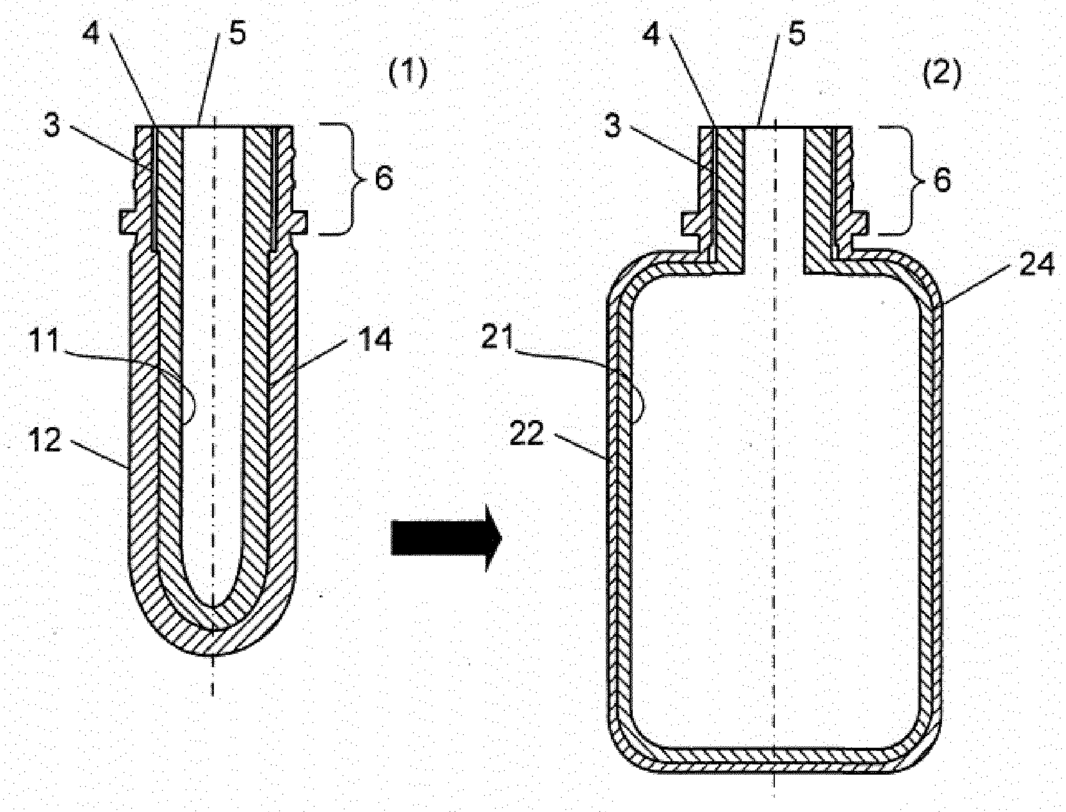

Fig.1A

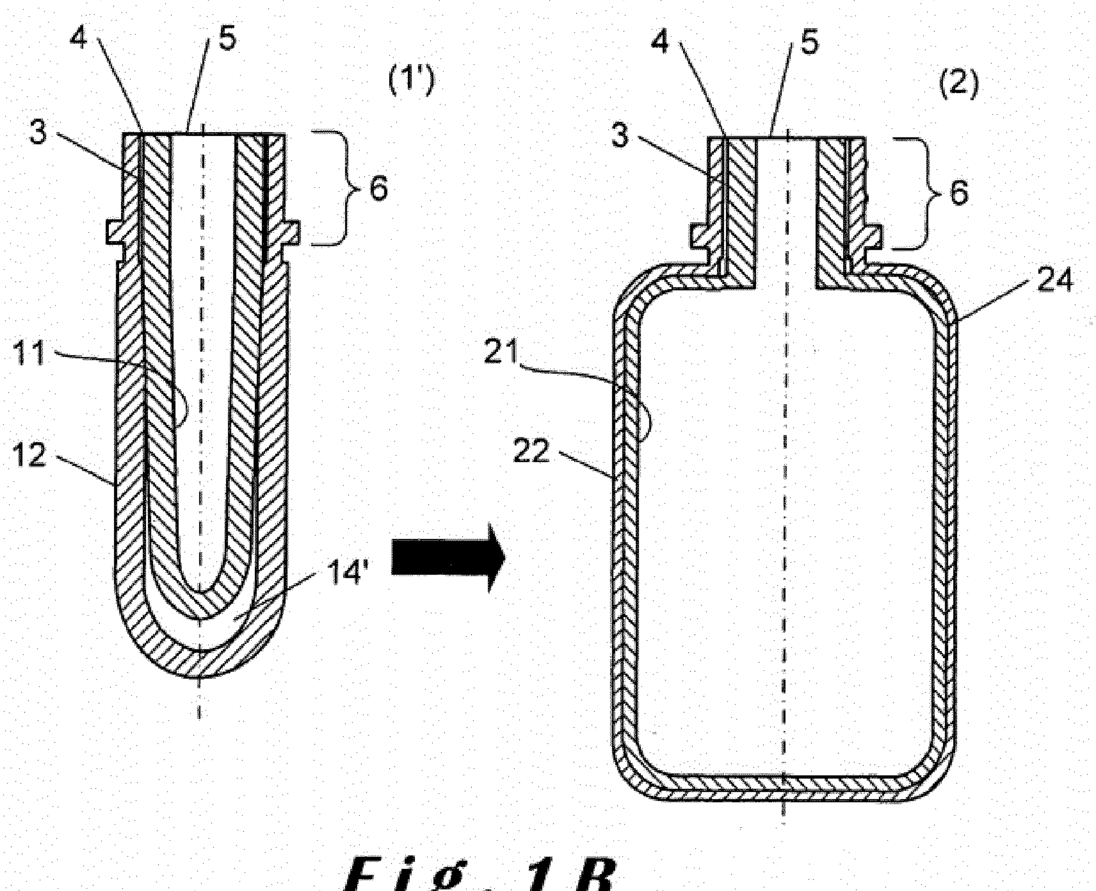

Fig. 1B

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- US 3484011 A **[0003]**
- US 3450254 A **[0003]**
- US 4330066 A **[0003]**
- US 4892230 A **[0003]**
- US 6238201 B **[0005]**
- JP 10128833 B **[0005]**
- JP 1010719 A **[0005]**
- JP 9208688 B **[0005]**
- US 6649121 B **[0005] [0006] [0009]**
- US 5301838 A **[0006] [0011]**
- US 5407629 A **[0006]**
- JP 5213373 B **[0006]**
- JP 8001761 B **[0006]**
- EP 1356915 A **[0006] [0007] [0009]**
- JP 10180853 B **[0006]**
- EP 1245499 A **[0010]**
- US 6238201 A **[0010]**
- JP 2005047172 B **[0011] [0025]**
- US 5921416 A **[0011]**
- WO 9108099 A **[0012]**